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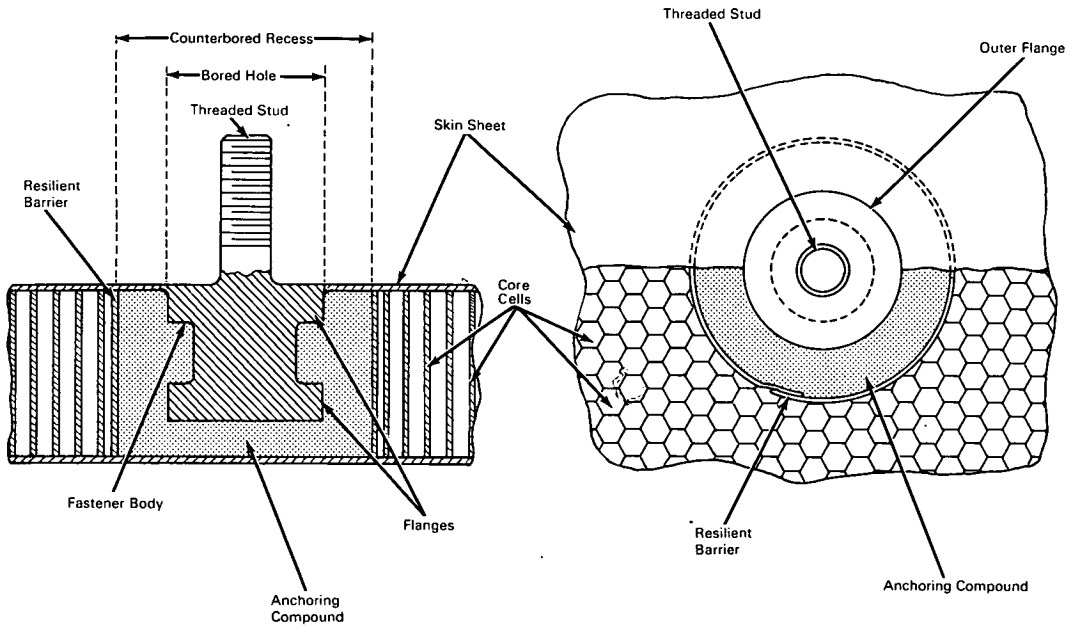
# NASA TECH BRIEF



## Fastener Distributes Stress Evenly from Sandwich-Panel-Hung Items




**The problem:** Fasteners for attaching external items to cellular-core sandwich panels frequently cause deformation of the panel skin sheets and crushing of core cells at the point of attachment. Adhesive-attached fasteners frequently suffer from improper adhesive filling. Incomplete filling of the space between core cells, fastener, and panel skin sheets results in an insecurely anchored fastener. Excessive pressure in filling crushes the walls of adjacent core cells, thus reducing the panel's strength and reliability.

**The solution:** A fastening means that is anchored in a sandwich panel by a constant, unvarying amount of adhesive. This minimizes changes in structural characteristics and configuration of the core cells and skin sheets.

**How it's done:** A hole the exact size of the fastener body is bored in one of the panel's skin sheets and an enlarged counterbored recess is made in the honeycomb core without disturbing the opposite skin sheet. A resilient barrier of aluminum or plastic of a depth equal to the height of the core cells is inserted through the hole in the drilled skin sheet and allowed to expand within the counterbored recess to form a seal around the recess perimeter. A predetermined amount of liquid anchoring compound is placed

(continued overleaf)

within the area formed by the expanded resilient barrier. The flanged body of the fastener is inserted to a point where its outer flange face is flush with the drilled skin sheet, completely filling the drilled opening. The anchoring compound thus forms around the fastener body to completely fill the space bounded by the resilient barrier, the fastener body, and the panel skin sheets. A threaded stud extends from the fastener body to provide the means of mounting an external device on the sandwich panel.



Source: Joseph Shapiro of North American Aviation, Inc. under contract to Manned Spacecraft Center (MSC-236)